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ABSTRACT

An investigation of the language transfer in second language (L2) lexico-semantic development looked at the relationship of the level of L2 proficiency and interlingual patterns of lexico-semantic correspondence. The linguistic categories used were verbs and adjectives. Relative degrees of difficulty for L2 learners were determined for four interlingual patterns: congruence, convergence, divergence, and semantic gap. It was hypothesized that the patterns would show an order of difficulty such that convergence would be more difficult than congruence and semantic gap would be more difficult than divergence. A short-answer test on these patterns was administered to 300 Japanese studying English in Japan, and results showed that within the verb condition, the patterns' order of difficulty was, in ascending order, congruence-divergence-convergence-semantic gap, and for the adjective condition the order was congruence-convergence-divergence-semantic gap. Individual analyses of stimuli indicated that L2 semantic development is constrained by language transfer interacting with other factors such as specific-exemplar learning. (MSE)

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LANGUAGE TRANSFER AND THE ACQUISITION OF PATTERNS OF LEXICO-SEMANTIC CORRESPONDENCE*

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Abstract

This study investigated the problem of language transfer in second language (L2) lexico-semantic development. The factors studied were the level of L2 proficiency and interlingual patterns of lexico-semantic correspondence. The linguistic categories under consideration were verbs and adjectives. Relative degrees of difficulty were determined for L2 learners dealing with four interlingual patterns: (1) CONGRUENCE (CG), (2) CONVERGENCE (CV), (3) DIVERGENCE (DV), and (4) SEMANTIC GAP (SG). It was hypothesized that the four patterns would show the order of difficulty CG<CV|DV<SG. A short-answer test was presented to 300 Japanese students studying English in Japan. The classification of interlingual patterns was successful in predicting relative difficulty: the overall results indicated a tendency toward the rank ordering of CG<DV|CV<SG across verb and adjective categories. Within the verb condition, the order CG<DV<CV<SG was obtained, while within the adjective condition the order CG<CV<DV<SG was confirmed. Individual analyses of stimuli indicated that L2 semantic development is constrained by language transfer interacting with other factors such as specific-exemplar learning.

Introduction

Researchers in the field of second language acquisition (SLA) have so far paid a good deal of attention to phonological and syntactic aspects of second language (L2) development. In the 1970's, for instance, a considerable number of studies concentrated on the investigation of morpho-syntactic development in L2 learning, focusing on errors relating to so-called 'functors' including function words and bound morphemes (e.g. Bailey, Madden, & Krashen 1974; Dulay & Burt 1974). Such inquiries resulted in the claim that functor (or grammatical) errors are predominantly developmental in nature, and not attributable to transfer.

It has been recognized, however, that the problems faced by L2 learners are diverse, entailing knowledge beyond morphology and syntax (see Felix 1980; Hatch 1978; Spolsky 1979). It has been pointed out that studies in SLA seldom go beyond syntactic questions (see Tarone, Swain, & Fathman 1976), while the role of semantics has not been sufficiently explored (see Bahns & Wode 1980; Lightbown 1980; Schmidt 1980; Strick 1980). The question therefore arises: Does the lack of evidence for transfer effects at the syntactic level also mean that language transfer is insignificant at other levels?

More researchers have recently begun to investigate the role of transfer in relation to the discourse and sociolinguistic aspects of the L2 learner's language (Beebe in press; Beebe, Takahashi, & Uliss-Weltz in press;

Olshtain & Cohen 1983; Rutherford 1983; Scarcella 1983). As a result, it has been claimed that language transfer has a unique role at each linguistic level.

The present study also focuses on language transfer and attempts to expand the scope of research by investigating transfer in a relatively new domain, lexico-semantics. It will demonstrate the unique role of transfer and its interaction with levels of L2 proficiency and linguistic categories.

Theory and Problem

The basic assumption of the study is that L2 learners rely on one-to-one correspondences formulated through matching a first language (L1) translation equivalent to a new L2 word (cf. Halliday, McIntosh, & Strevens 1964; Takahashi 1984; Tanaka 1983). This reliance often results in transfer errors at the lexico-semantic level. The following examples illustrate this point:

(1) The world has become narrow [sc. small].

(2) We pay $280 every month to borrow [sc. rent] this apartment.

(3) I don't like this tea. It's too thick [sc. strong].

These examples are representative of a number of errors found in Japanese ESL learners' writing and speech. Deviations are due to the incorrect choice of words in terms of collocational restrictions. The choice of words can be often accounted for by the one-to-one correspondence between

L1 and L2 lexical items which the L2 learner formulates and later depends upon.

For instance, the substitution of narrow for small in Example (1) can be explained by the close association between narrow and the Japanese adjective semai. The learner's reliance on equational frameworks such as semai = narrow increases the likelihood of lexico-semantic transfer. In the present study, therefore, transfer errors are operationally defined as the instances where the choice of L2 items is influenced by the most common and frequent translation from the L1, and violates collocational restrictions or does not match the learner's intended meaning.

Suppose that a Japanese ESL learner first encounters the L2 item narrow as in 'This road is very narrow'. In such an instance, the most appropriate translation equivalent for narrow in Japanese is semai. If this equation semai = narrow holds true in many instances, the association may gradually become stronger. This equation causes minimal problem in contexts such as semai michi 'narrow road' and semai rooka 'narrow hallway'. The same equation is, however, the source of error if used in contexts such as semai seken 'small world' (instead of '*narrow world') and semai kyooshitsu 'small classroom' (instead of '*narrow classroom').

Similarly, a Japanese ESL learner encounters L2 items such as look and see, whose most common translation

equivalents are both miru in Japanese. If the learner associates miru with both look and see without knowing the difference between the two L2 items, s/he may interchangeably use look and see regardless of context.

Based on the observation of lexico-semantic transfer errors, this study proposes that matched L1-L2 pairs can be categorized into interlingual patterns of lexico-semantic correspondence. Each pattern is defined according to the strength of association between L1 and L2 words elicited in the following preliminary study. Twenty advanced Japanese ESL students were asked to give Japanese equivalents to certain English verbs and adjectives. The items were given as single words. About two weeks later, they were asked to do a similar task, but this time to give English equivalents to Japanese verbs and adjectives.

The items used in the study were selected from the most basic verbs and adjectives which are taught in the first three years of English learning, i.e. in junior high school, in Japan. The selected items are also very commonly used in that they are rated as among the first 500 or 1,000 most frequently used words according to Thorndike (1975). The overall results indicated that many L1 items were strongly associated to L2 items, and vice versa, with a high degree of agreement among 20 subjects.

The interlingual patterns substantiated by the preliminary study are: (1) CONGRUENCE (CG), (2) DIVERGENCE (DV), (3) CONVERGENCE (CV), and (4) SEMANTIC GAP (SG). In

this study, CG is operationally defined as a pair of word association items which reached a level of agreement over 85% among 20 advanced Japanese ESL subjects in both directions (i.e. both from L2 to L1 and from L1 to L2). If two or more items are associated with one item with a high degree of agreement (>.85) at least in one direction, they form either a pattern of DV or CV. If one of the DV or CV items shows a high level of agreement (>.85) in both directions, it is considered to be an instance of CG within DV or CV. Several sets of items under the first three patterns were obtained, based on the results of the preliminary study, as listed in Figure 1.

Insert Figure 1 about here

CG is the pattern in which a pair of L1 and L2 items are mutually associated and congruent with each other. This pairing holds true in certain (and perhaps many) collocations. SG is a condition which presents some discrepancy between L1 and L2 congruent items due to certain co-occurrence restrictions. In this sense, SG may be regarded as an occurrence-specific condition, which puts limitations on the CG pattern. Thus, SG is not independently definable, but is definable in terms of CG.

For instance, the Japanese adjective <u>semai</u> can be roughly characterized by the features [+width, -maximal] or [+space, -maximal], and the English word <u>narrow</u> by [+width,

-maximal]. That is, semai co-occurs with at least two types of lexical items: (1) items such as michi 'road' [+width] and (2) items such as heya 'room' [+space] (cf. Miura 1983:171). The English word narrow, on the other hand, can be used with the first type, but not with the second. The equation semai = narrow, therefore, causes no problem in the collocation NARROW road (SEMAI michi). This is an instance of CG. The same pair, however, entails a transfer error if used with an item of the second type, since *NARROW room, for instance, will be judged to be collocationally unacceptable or semantically different from the learner's intended message (i.e. SMALL room). This is an instance of SG.

DV is the pattern in which one L1 item corresponds to two or more L2 items. For instance, the Japanese verb kariru corresponds to borrow and rent. The English verbs borrow and rent may refer to the same action, but the latter is marked with an extra feature, [+payment], which the Japanese verb kariru overlooks. Thus the acquisition of DV requires the learner to distinguish one DV item from another by 'sifting out' the semantic features of each L2 item.

CV is the opposite of DV. It is the pattern in which two or more L1 items become coalesced into one item in the L2. For example, the Japanese verbs yuderu and wakasu both correspond to the English verb boil. The two Japanese verbs are distinct in that each co-occurs with different types of lexical items, e.g. eggs [+solid food] and water [+liquid]

respectively (cf. Kunihiro 1970; Lehrer 1974). The acquisition of CV requires the learner to 'blend' the coalesced items into one in the L2.

The present study asks the following question: How does each interlingual pattern influence L2 lexico-semantic development in Japanese ESL learners? More specifically, what is the order of difficulty for the four patterns? It is hypothesized that CG is the least difficult since closely associated L1-L2 pairs are regarded as the psycholinguistic basis of positive transfer. SG, on the other hand, is hypothesized to be the most difficult because it entails the lack of vital association. SG requires learners to know exactly in which collocational relations their L1=L2 strategy does not work, and also to know which item will substitute for the item rejected in the problematic collocational relations. DV and CV are expected to be in between.

Experiment

A short-answer test was presented to a total of 300 Japanese students studying English in Japan--100 each from three levels of English proficiency (Mean ages: Level-I, 16.5; Level-II, 19.8; Level-III, 20.3). The test consisted of 32 test items, divided into two subtests of 16 items each on the basis of two categories--the Verb (V) Test and the Adjective (A) Test. Each subtest contained the four treatments CG, DV, CV and SG.

The stimuli were short-answer questions consisting of one or two short English sentences with a blank to be filled in. Each sentence was paired with its Japanese translation in order to clarify the intended meaning of each item so that the student could find the word that would best fit in the context.

Every student was tested under 8 treatments, i.e. 2 (V and A) x 4 (CG, DV, CV, SG). The order of presentation of stimuli was randomized across subjects. This study as a whole examined the interaction among one between-subject variable (LEVEL of proficiency) and two within-subject variables (linguistic CATEGORY and interlingual PATTERN) with repeated measures.

Results

Mean numbers of correct items for each condition are given in Table 1, and the analysis-of-variance table for the obtained data is given in Table 2.

Insert Tables 1 and 2 about here

The main effect of the variable LEVEL of Proficiency is significant ($F[2, 297] = 100.74$, $p<.01$). The students at a higher level of L2 proficiency consistently scored higher than those at a lower level. This effect is seen in the following mean scores: Level-I, 13.28; Level-II, 15.21; and Level-III, 19.05.

The main effect of the variable PATTERN is also found to be significant ($F[3, 891] = 1,558.86$, $p<.01$). As we expected, different patterns of lexico-semantic correspondence had different effects on the students' performance. The mean scores for the four patterns among the total population (N=300) were: CG, 6.99; DV, 3.82; CV, 3.65; SG, 1.39. As far as these mean scores are concerned, there is a tendency toward the order of difficulty CG<DV<CV<SG.

The interaction between the LEVEL and PATTERN variables is found to be significant ($F[6, 891] = 15.8$, $p<.01$). As seen in Figure 2, the effect of PATTERN is slightly different for each level of the LEVEL variable.

Insert Figure 2 about here

As regards the order of difficulty, we notice that the order of the adjacent pair DV and CV changes as a function of proficiency level. Moreover, the difference between the mean scores for these two patterns does not seem to be large enough to make a definite claim concerning the order ($t[598] = 1.32$, $p<.20$). Let us then conclude, for the time being, that the obtained order of difficulty is CG<DV|CV<SG across verb and adjective categories.

As we turn to the CATEGORY factor, we first notice that its main effect did not turn out to be significant ($F[1, 297] = 1.29$, NS). The students scored almost the same on

the Verb and Adjective Tests: the mean score for the verb category was 7.86 and that for the adjective category, 7.99. However, the interactions of CATEGORY with the other two variables are found to be significant ($F[2, 297] = 17.81$, $p<.01$ for LEVEL x CATEGORY; $F[3, 891] = 77.28$, $p<.01$ for PATTERN x CATEGORY). The interaction among all the three variables is also significant ($F[6, 891] = 17.69$, $p<.01$). These interactions are illustrated in Figures 3 and 4.

Insert Figures 3 and 4 about here

In comparing the two figures, we notice that the patterns showed different developments as a function of linguistic category. With respect to the rank ordering of difficulty for the four patterns, there is observed a strong tendency toward the order CG<DV<CV<SG in the verb category irrespective of level of proficiency. Within the adjective condition, the order CG<CV<DV<SG was obtained. The only exception was the order for Proficiency Level III. Despite this exception, since the difference between the overall mean scores for median pair DV and CV in the adjective category was large ($t[598] = 6.30$, $p<.001$), we may conclude that the order of difficulty in this category is CG<CV<DV<SG.

To summarize, the overall results indicate that the pattern of lexico-semantic correspondence is indeed a significant factor. The classification of each pattern

based on the notion of transfer has been found to be successful in predicting level of difficulty. With respect to the two patterns ranked at the extremes, CG and SG, the hypothesis was confirmed by the results, which proved the CG pattern to be the least difficult and SG to be the most difficult irrespective of level of proficiency or linguistic category. As regards the intermediate patterns DV and CV, we have found that the order of this pair tends to vary according to different proficiency levels and linguistic categories, especially due to the latter.

Discussion

Association as a Facilitating or Constraining Factor

It was hypothesized that CG is the least difficult pattern because learners can simply transfer their L1 knowledge into the L2 through one-to-one correspondence. Close association therefore is a facilitating factor in the acquisition of CG.

At the same time, it was hypothesized that the SG pattern is the most difficult because SG requires learners to know in which collocations their L1=L2 strategy does not work, and moreover to search for the item which will substitute for the rejected item outside of the L1=L2 framework which the rejected item belongs to. For example, the item narrow is rejected in the collocational relation with world. In this case, the learner has to learn that the

item which will substitute for narrow is small, which is found in the equation chiisai = small, i.e. outside of the equation semai = narrow.

It was also posited that the application of the L1=L2 strategy causes transfer errors. In examining the students' responses to SG items, we find that the low scores for this pattern are, most of the time, due to a reliance on one-to-one correspondence. Take the following SG item for instance:

(4) The farmers in this village are ____ vegetables.

To this item, the majority of students (Level-I, 90%; Level-II, 74%; Level-III, 56%) gave the incorrect response make (making), relying on the equation tsukuru = make. Close association therefore is considered to be a constraining factor in the acquisition of SG.

However, the negative effect of one-to-one correspondence decreases as learners acquire more experience with the L2 (cf. Taylor 1975). In dealing with the deceptive SG pattern, the learners gradually learn to inhibit their automatic tendency toward one-to-one correspondence.

Influence of Specific Exemplars

As we turn our attention to the interactions, we notice that the scores for most CV items in the verb condition are relatively lower than CV items in the adjective condition. For instance, only 28% of 300 students were able to give the

correct response wear(s) to the following CV item:

(5) Do you know that man who always ____ that crazy hat?

Those who were unable to answer wear gave various responses or simply left the blank unfilled. In the post-test interview of the Level-I students, an interesting phenomenon was observed. When asked what they would say if the word jacket were substituted for hat in the above item, many were able to give the correct answer wear (in this case, the lexical item for wear in Japanese would be kiru 'wear' [+torso], not kaburu 'wear' [+head]). Thus, most students did know the word wear, but many of them could not directly associate it with the co-occurring item hat or the feature [+head] which entails the choice of verb kaburu.

This observation suggests that the students' performance in dealing with this item was constrained by the specific context in which the word wear was first acquired, e.g. wear co-occurring with jackets or shirts [+torso]. Let us call these early acquisitions 'specific exemplars' (cf. Carey 1978; Tanaka 1983).

It is also possible that students had difficulty dealing with Item (5) because of the close association between kiru and wear. Notice that this pair is an instance of CG within a CV pattern (see Figure 1). In other words, this is an example of word association constraining the acquisition of CV. This interpretation supports the above specific-exemplar point of view: because of the specific context (e.g. jackets [+torso]) where wear was first

acquired, the association between kiru and wear became strong.

Another instance of specific-exemplar phenomenon was found in the acquisition of DV in the verb condition. To the following DV test item, nearly 90% of students responded with the correct answer hear:

(6) What's that noise at the door? Did you ____ it, too?

The same DV pair kiku--hear was contained in the following control item:

(7) Do you ____ the music next door? I think they are having a party.

To this item, a lower percentage (67%) of students gave the correct answer hear. The percentage of the incorrect answer listen (to) was higher for Item (7) (28%) than for Item (6) (8%) (see Tables 3 and 4).

Insert Tables 3 and 4 about here

That is, more students chose listen (to) for the stimulus with the word music than for that with noise. This seems to suggest that the expression listen to music is a specific exemplar, and the word music entails the choice of listen regardless of context.

The acquisition of CV and DV seems to be influenced by the specific-exemplar factor, especially in the area of verbs. Although we found some instances where this factor was influential in the adjective condition, it seems

generally more difficult for learners to become free of specific exemplars in the verb condition. Thus, the interaction between PATTERN and CATEGORY seems to be due to specific exemplars.

It is possible to argue that adjectives can be characterized by means of semantic properties more easily than verbs (cf. Dillon 1977:33), while verbs present problems in that they tend to attract the learner's attention towards co-occurring lexical items. The issue of possible differences in the acquisition of different linguistic categories, however, remains for future investigation (cf. Carey 1982).

Conclusion

In view of the overall findings, we may conclude that language transfer is indeed a complex but very real phenomenon (cf. Gass & Selinker 1983). The acquisition of each interlingual pattern starts with close associations between L1 and L2 items, and especially in the areas of verbs, with specific exemplars. With increasing L2 proficiency, the influence of initial association decreases, but the decrease is affected by linguistic categories and interlingual patterns.

As Felix points out, it is therefore necessary 'to study and specify the conditions under which language transfer typically occurs or does not occur...' (1980:107). Although research in the development of L2 lexico-semantics

is only just beginning, it is hoped that future research will explore a wide range of factors responsible for language transfer.

Notes

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Figure 1

Patterns of Lexico-Semantic Correspondence

Verbs

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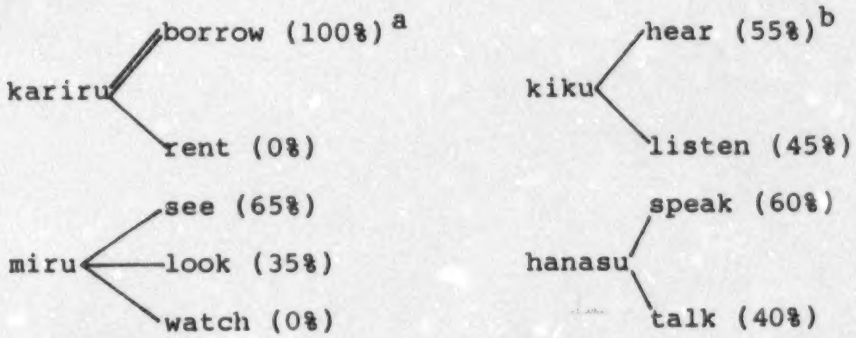
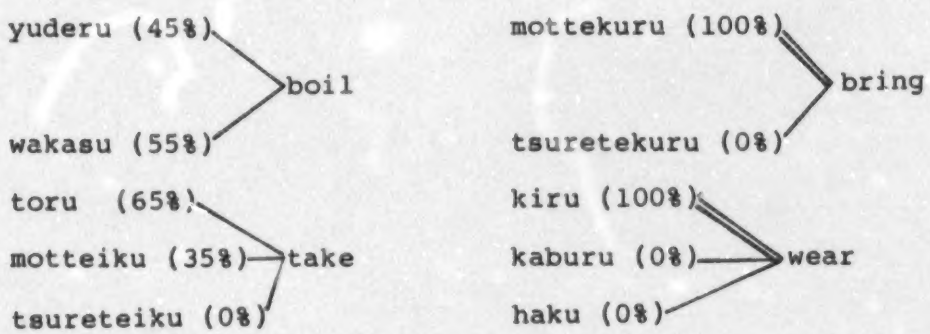
1. CONGRUENCE (CG)

ryorisuru = cook	nomu = drink
untensuru = drive	taberu = eat
sodateru = grow	motsu = have
tsukuru = make	noru = ride
okuru = send	kaku = write

2. DIVERGENCE (DV)



3. CONVERGENCE (CV)



(continued on the next page)

(Figure 1 continued)

Adjectives

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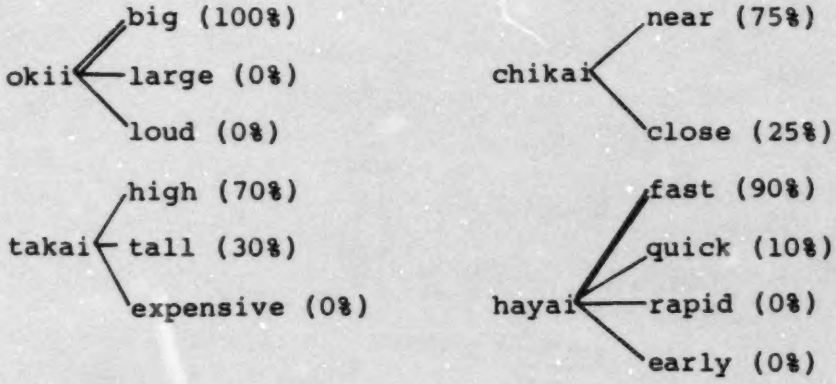
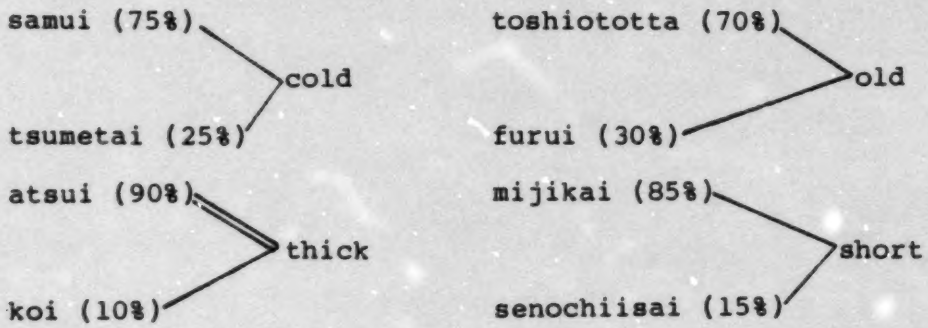
1. CONGRUENCE

aoi	= blue	fukai	= deep
midorino	= green	nagai	= long
hikui	= low	semai	= narrow
chiisai	= small	tsuyoi	= strong

2. DIVERGENCE (DV)



3. CONVERGENCE (CV)



Notes to Figure 1:

[a]The double line indicates CG within either DV or CV.

[b]The percentage indicates the strength of word association between the respective word and its corresponding word. For instance, in the case of the DV pattern kiku--hear/listen, given the cue word kiku, 55% of subjects (N=20) associated it with hear, and 45% with listen. (Both hear and listen were associated with kiku--i.e. from L2 to L1--with a high level of agreement [>.85].)

Table 1

Mean Number of Correct Items

( ) = Standard Deviations

		CG	CV	DV	SG	Total
	V	3.55	.61	1.80	.16	6.12
Level-I		(.61)	(.78)	(.72)	(.42)	(1.58)
(n=100)	A	3.32	2.15	1.18	.51	7.16
		(.63)	(.52)	(.93)	(.61)	(1.53)
	V	3.57	1.55	1.91	.55	7.58
Level-II		(.66)	(.88)	(.77)	(.74)	(1.81)
(n=100)	A	3.28	2.15	1.63	.57	7.63
		(.71)	(.63)	(1.04)	(.67)	(1.69)
	V	3.76	2.17	2.50	1.44	9.87
Level-III		(.49)	(1.05)	(.86)	(.89)	2.06)
(n=100)	A	3.48	2.32	2.43	.95	9.18
		(.70)	(.66)	(.98)	(.88)	(2.00)

(continued on the next page)

(Table 1 continued)

	V	3.63	1.44	2.07	.72	7.86
OVERALL		(.60)	(1.11)	(.84)	(.89)	(2.39)
(N=300)	A	3.36	2.21	1.75	.68	7.99
		(.69)	(.61)	(1.11)	(.75)	(1.95)

Key:

CG--CONGRUENCE; CV--CONVERGENCE; DV--DIVERGENCE;

SG--SEMANTIC GAP; V--VERB; A--ADJECTIVE

Table 2

A Final Analysis of Variance

Source of Variation	df	SS	MS	F
Between Subjects	299	533.62	1.78	
A [LEVEL]	2	215.68	107.84	100.7*
Ss within groups	297	317.94	1.07	
Within Subjects	2,100	3,673.5	1.75	
B [PATTERN]	3	2,376.12	792.04	1,558.9*
A x B	6	48.17	8.03	15.8*
B/Ss within grps.	891	452.71	.51	
C [CATEGORY]	1	.68	.68	1.29
A x C	2	18.83	9.41	17.8*
C/Ss within grps.	297	157.00	.53	
B x C	3	116.96	38.99	77.3*
A x B x C	6	53.54	8.92	17.7*
BC/Ss within grps.	891	449.50	.50	
TOTAL	2,399	4,207.12		

*p < .01

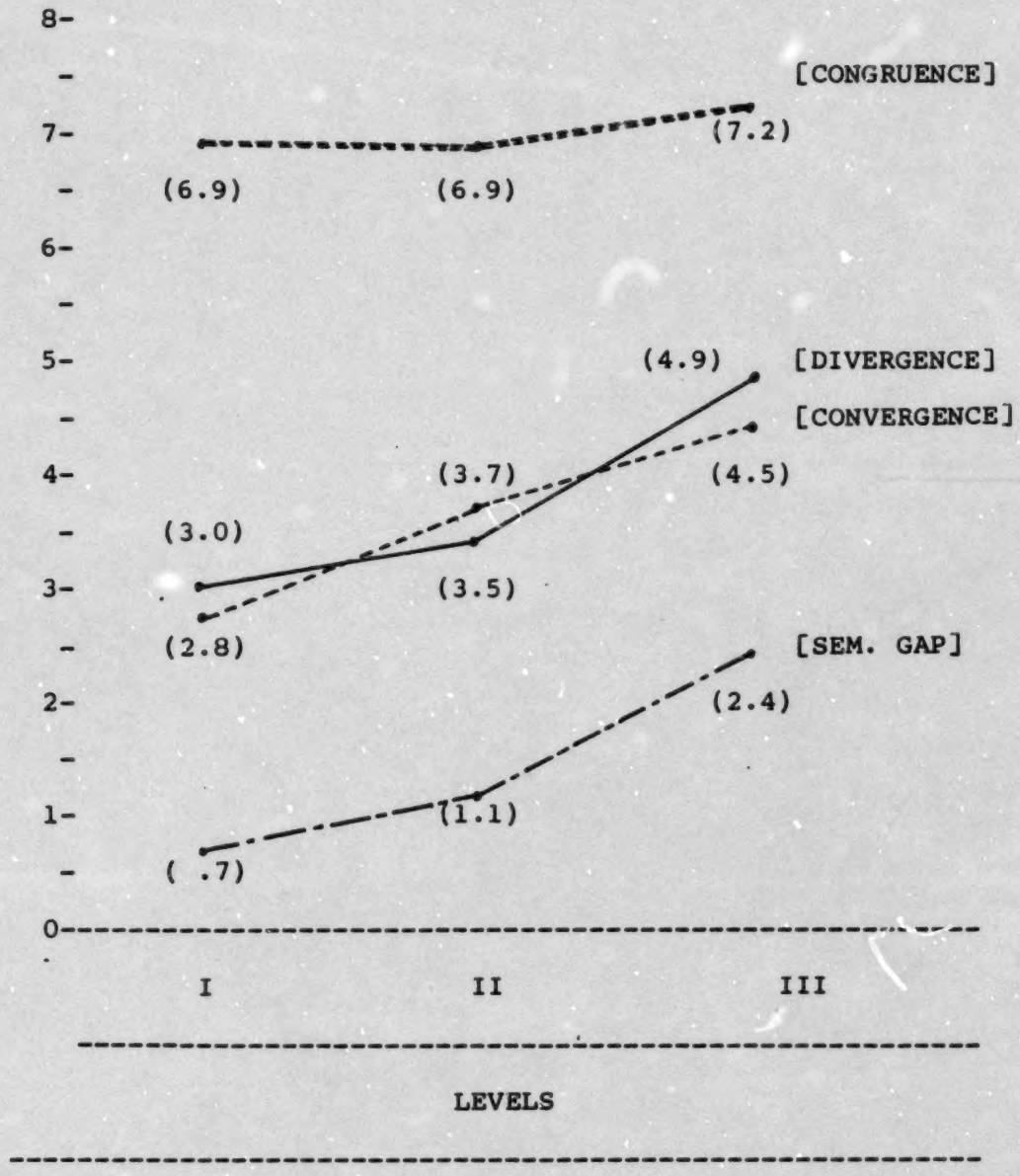


Figure 2

Mean Achievement of Level-I, II and III Groups

(LEVEL x PATTERN)

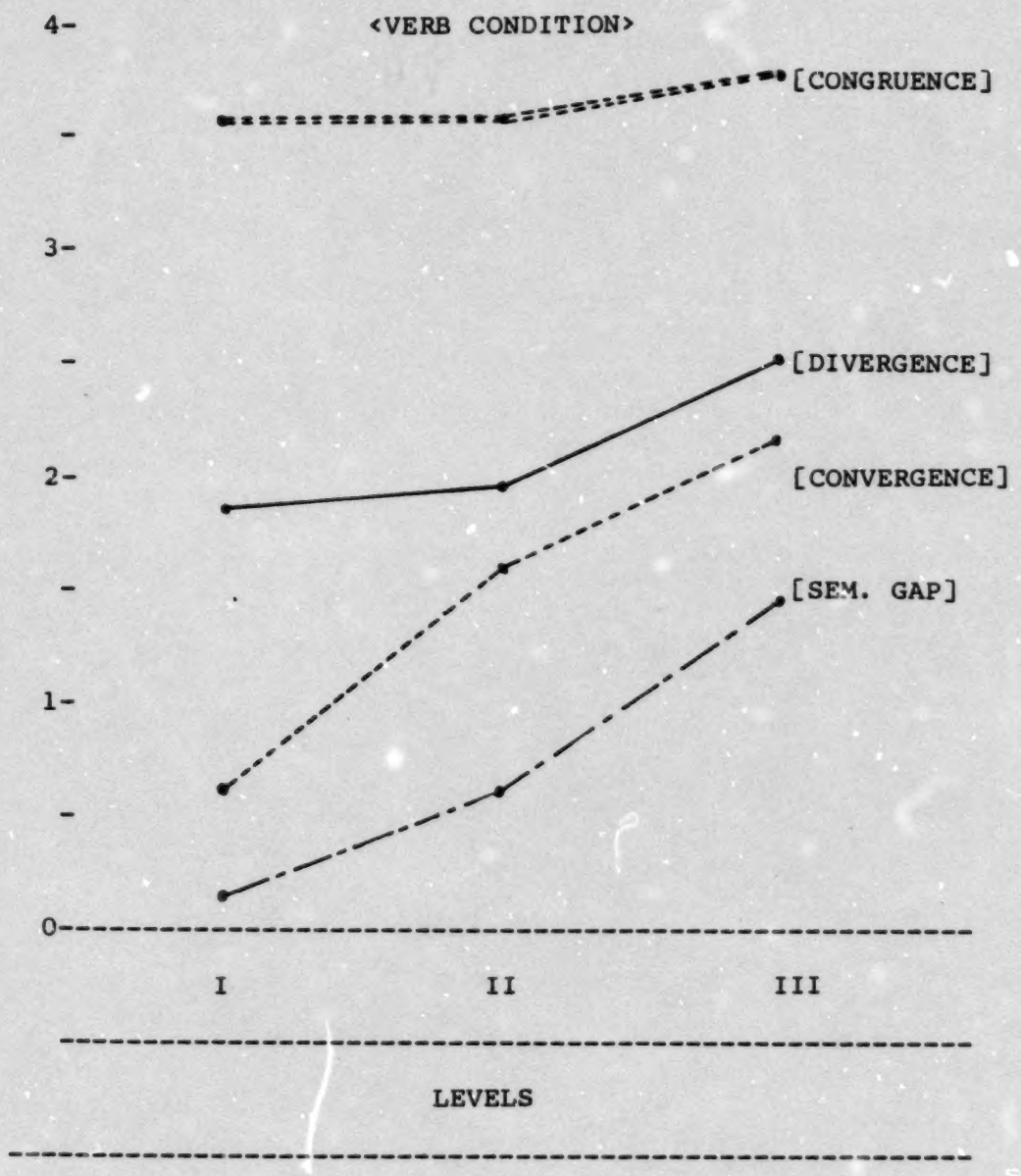


Figure 3

The Average Performance

by Level-I, Level-II and Level-III Groups

on the VERB Test

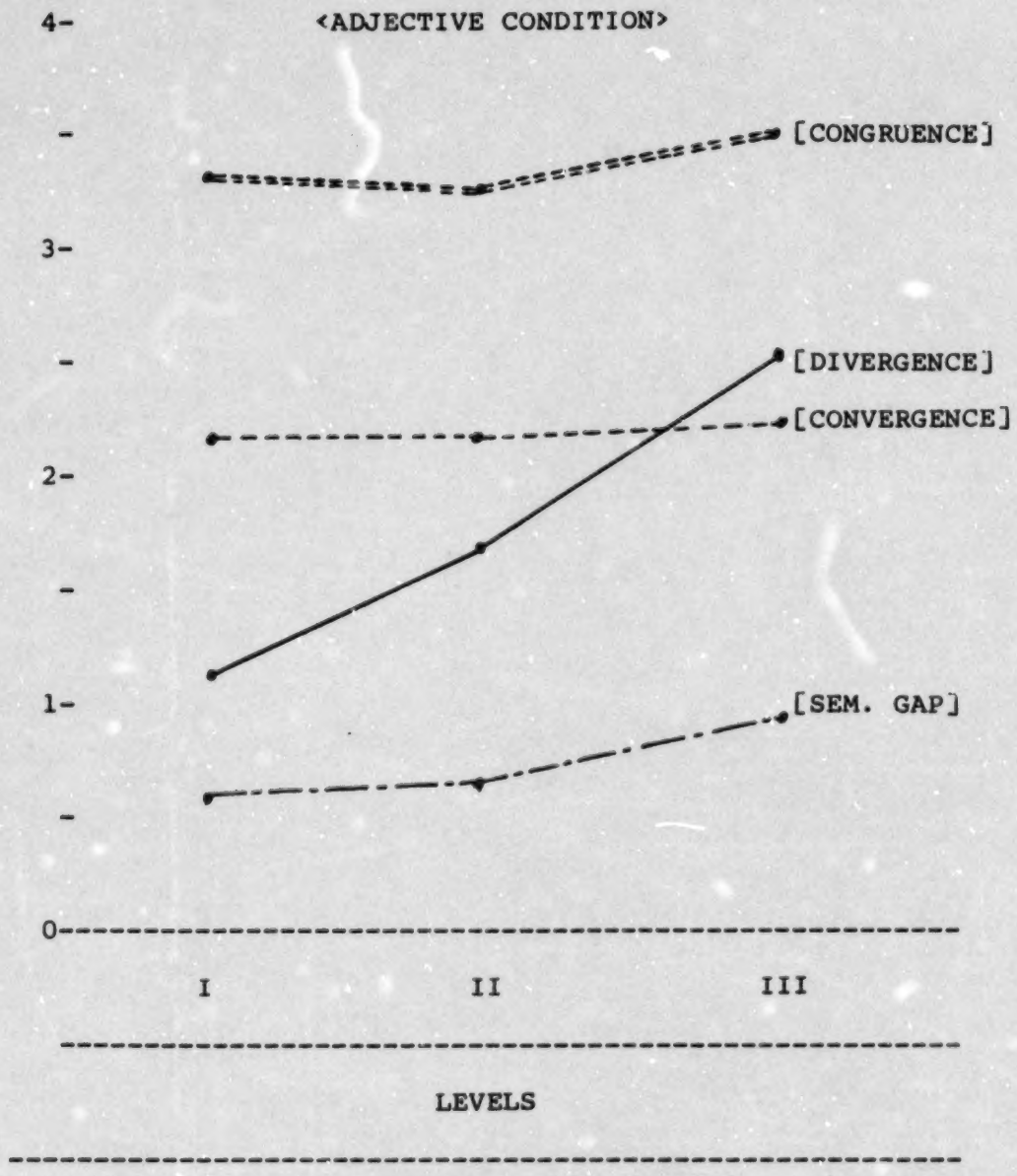


Figure 4

The Average Performance

by Level-I, Level-II and Level-III Groups

on the ADJECTIVE Test

Table 3

The Summary Data for the Responses

to the /kiku/--hear <noise> Item

What's that noise at the door? Did you _____it, too?

/Ano doa-no oto-wa nandesho. Anatani-mo kikoemashita-ka./

Answer: hear

Responses	LEVELS I (n=100)	II (n=100)	III (n=100)
1. hear	83	90	95
2. listen (to)	14	8	3
3. OTHER*	2	1	1
4. NO ANSWER	1	1	1

*know, sound

Table 4

The Summary Data for the Responses

to the /kiku/--hear <music> Item

Do you _____the music next door? I think they are having a party.

/Tonari-no ongaku-ga kikoemasu-ka. Paati-o yatteirunodato omoimasu./

Answer: hear

Responses	LEVELS I (n=100)	II (n=100)	III (n=100)
1. hear	50	68	84
2. listen (to)	47	25	13
3. OTHER*	2	5	3
4. NO ANSWER	1	2	0

*sound, know